

4900

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GUIDELINES AS DESCRIBED IN SECTION
3.3(a), EXECUTIVE ORDER 12356.

Diag. Cht. No. 4000

Form 504	
U. S. COAST AND GEODETIC SURVEY DEPARTMENT OF COMMERCE	
DESCRIPTIVE REPORT	
Type of Survey	<i>Hydrographic</i>
Field No. <i>7</i>	Office No. <i>4900</i>
LOCALITY	
State	<i>Hawaii Island</i>
General locality	<i>French Frigate</i>
Locality	<i>Shoals, East Island</i>
<i>and Vicinity</i>	
<i>1928</i>	
CHIEF OF PARTY	
<i>K.T. Adams.</i>	
LIBRARY & ARCHIVES	
DATE	

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Form 504

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
E. Lester Jones, Director

C. & G. SURVEY
L. & A.
JUN 1 1928
Asc. No.

Hawaiian Is.
State: Terr. of Hawaii.

DESCRIPTIVE REPORT
~~Topographic~~ } Sheet No. 7. 4900
Hydrographic }

LOCALITY
Hawaiian Is.
Terr. of Hawaii.
French Frigate Shoals.
East Island and Vicinity.

1928.

CHIEF OF PARTY
K. T. Adams, H. & G. Engr.

NAVY DEPARTMENT PRINTING OFFICE

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DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

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REG. NO.

4900

HYDROGRAPHIC TITLE SHEET

The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

Field No. 7.

REGISTER NO. 4900

State ~~Territory of Hawaiian Is.~~

General locality French Frigate Shoals.

Locality East Island and Vicinity.

Scale 1-10,000. Date of survey July 10 - Sept. 25, 1928.

Vessel Motor-sailer and whaleboat, with outboard motor.

Chief of Party K. T. Adams, H. & G. Engr.

Surveyed by Glendon E. Boothe, Jr. H. & G. Engr.

Protracted by Glendon E. Boothe, Jr. H. & G. Engr.

Soundings penciled by Glendon E. Boothe, Jr. H. & G. Engr.

Soundings in fathoms fath

Plane of reference M.L.W.

Subdivision of wire dragged areas by

Inked by J. Walker

Verified by

Instructions dated March 26, 1928., 192

Remarks:

g r o

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PURSUANT TO DOC SYSTEMATIC REVIEW
GUIDELINES AS DESCRIBED IN SECTION
3.3(a), EXECUTIVE ORDER 12356.

DESCRIPTIVE REPORT
to accompany

HYDROGRAPHIC SHEET NO. 7.

Territory of Hawaii.
French Frigate Shoals.
East Island and Vicinity.
Scale 1- 10,000.

AUTHORITY:

Instructions of the Director dated March 26, 1928.

PURPOSE:

The area covered by this sheet is the continuation of Hydrographic Sheet No. 8. The purpose is to find protected anchorages in and around East Island, French Frigate Shoals, as well as the investigation of the area covered by the sheet.

LIMITS:

This sheet covers the area around East Island, French Frigate Shoals, Territory of Hawaii, running to Gin Island on the southwest, and nearly to Round Island on the northeast. The sheet is bounded on the south by Hydrographic Sheet No. 8; on the west by Hydrographic Sheet No. 12; on the east by Hydrographic Sheet No. 13; and on the north by the shoal water reaching to the outer encircling reef of French Frigate Shoals.

SURVEY METHODS:

The work was done by a sub-party working from the U. S. C. & G. S. S. GUIDE. The motor-sailer was used for the first twelve days of work. A whaleboat, equipped with an outboard motor, was used for the remaining fourteen days.

The personnel of the party consisted of one officer in charge, right angle, and plotting; one officer steering, and left angle; one engineer, while using the motor-sailer; three leadsmen; and a seaman in place of the engineer, while using the whaleboat.

The usual method of hand lead sounding was used. The sounding lines were run northeast and southwest, true. The lines were spaced one hundred meters apart out to the ten fathom curve, and two hundred meters apart from the ten to the fifteen

fathom curve. The area, as a whole, is filled with coral heads, shoals, and reefs. The coral reefs awash were defined by running sounding lines around them. The shoalest soundings on coral heads were found whenever practicable, without spending too much time. No ranges of any kind were available, and the steering was done with a boat compass. Great difficulty was encountered in steering a straight course due to the very changeable bottom, the numerous shoals, and reefs, thereby causing variable currents. The compass courses cannot be used in plotting as much of the time the boat had to be headed from ten to forty degrees from the true course in order to make it good.

CONTROL:

The work was controlled by means of wooden tripod signals, erected on East Island, two forty foot signals on Round Island, and Gin Island, and iron pipe signals, with banners, erected on the islands, and reefs awash. All of the signals were located by triangulation, except signal FAR, which was located by topography.

DESCRIPTION:

The area covered by this sheet has a very marked coral line leading from Round Island to Gin Island. A great part of this reef is awash altho not continuously so. Coral reefs awash and sunken are very plentifully found over the whole of this area. An area about three-eighths of a mile wide to the south and southwest of the center of East Island is very nearly free of all coral heads and reefs from the ten fathom curve out. At this point the ten fathom curve runs very close to the southern side of the reef around East Island. To the northward and northeastward of East Island the water is less than nine fathoms, generally, and shoals off as the distance from East Island increases. The bottom is very irregular over the area covered by this sheet, and is formed of white sand, and coral. On the northern limits of the sheet the white sand bottom with small detached coral heads gives a much lighter color to the water. Over the greater part of the sheet the bottom is mostly coral with patches of sand. At low tide the coral reefs are bare but all are covered with water at high tide. With small boats, during fair weather, no difficulty is encountered in landing on the reefs that are bare at low water.

TIDAL DATA:

A portable tide gauge was established on the eastern side of the reef around East Island. Tidal data on the days that the tide gauge was not in operation was secured by a comparison with the station at Honolulu, T. H.

ANCHORAGES:

The area covered by this sheet is protected by the semi-circular, outer, coral reef, except on the southern side. The prevailing wind is from the northeast. An anchorage in the area south of East Island, between 209 degrees, true, from signal N. W. BASE, and 181 degrees, true, from signal END, will afford protection in all, except southerly and westerly weather, with fair holding ground in from twelve to fifteen fathoms. This area, from the ten fathom curve out, is the only seemingly clear area on the sheet.

The reef, around East Island, extends westward one and a quarter miles. The greatest part is awash most of the time, and has breakers the entire length. In an endeavor to find an anchorage to afford protection in southerly weather, three locations and their approaches were searched in detail. An anchorage 580 meters, north, true, from signal N. W. BASE to be reached from the northwest, coming in to the south of signals NEAR and DUB; an anchorage between the reef on which signal BARE is located and East Island, 690 meters, 48 degrees, true, from S. E. BASE, to be reached from the south, coming in to the east of East Island; and an anchorage between the signals PIPE and WASH, 450 meters, 4 degrees, true, from signal WASH to be reached from the southwest. None of the above locations can be recommended, except for small and medium sized boats. It is probable that the last of the mentioned anchorages could be used by a small ship, and safely reached with a minimum depth of three and a half fathoms, except that a number of coral heads would have to be avoided. Small boats can land on the northwestern side of East Island on a sandy beach free from coral, and have one fathom of water leading up to the beach.

STATISTICS:

Statistics of the work are attached to this report.

Respectfully submitted,

Glendon E. Boothe
Glendon E. Boothe,
Ct. H. & G. Engr.

Approved and forwarded.

K. T. Adams,
H. & G. Engr.
Chief of Party.

STATISTICS FOR HYDROGRAPHIC SHEET NO. 7.

DATE	DAY	POSITIONS	NO. OF SOUNDINGS	STATUTE MILES.
1928.				
July	10	a	91	306
"	11	b	120	472
"	12	c	140	498
"	13	d	65	250
"	17	e	129	584
"	18	f	130	592
"	19	g	135	572
"	20	h	73	318
August	4	j	74	414
"	5	k	113	604
"	6	l	146	746
"	7	m	106	569
"	15	n	100	554
"	16	p	88	430
"	17	q	125	685
"	21	r	34	178
September	9	s	70	373
"	14	t	79	444
"	15	u	103	426
"	17	v	119	566
"	18	w	149	527
"	19	x	107	395
"	22	y	164	625
"	23	z	134	423
"	24	aa	53	165
"	25	bb	8	7*
TOTALS	26	26	2655	11,723
				412.8

Note:

Days a to m, inclusive - motor-sailer.

Days n to aa, inclusive - Whaleboat.

Day bb , - Gig.

* Detached soundings.

TIDAL DATA

for

HYDROGRAPHIC SHEET NO. 7.

East Island and Vicinity.
French Frigate Shoals.
Territory of Hawaii.
1928.

A portable -automatic tide gauge was established on the edge of the reef at the southeast end of East Island, latitude 23 - 46.96'N., longitude 166 - 12.53' W.

Simultaneous Comparisons were made with the Honolulu tides for the periods July 11 - 16, August 5 - 21, September 9 - 15, and September 19 - 25, inclusive.

These gave a value of MLLW of 3.12 feet on the tide staff at French Frigate Shoals. An independent determination of MLLW gave a value of 3.04 feet. The value of MLLW of 3.1 feet was used for the reduction of the soundings.

During days when the French Frigate Shoals tides were not available, Honolulu tides were used with the time 21 minutes earlier and a range of 0.73, as determined by the Simultaneous Comparisons.

A summary of the tides is as listed below:

French Frigate Shoals tides used.

July 12	-	c-day
" 13	-	d "
" 18	-	f "
Aug. 4	-	j "
" 5	-	k "
" 6	-	l "
" 7	-	m "
" 15	-	n "
" 16	-	p "
" 17	-	q "
" 21	-	r "
Sept. 9	-	s "
" 14	-	t "
" 15	-	u "
" 17	-	v "
" 18	-	w "
" 19	-	x "
" 22	-	y "
" 23	-	z "
" 24	-	aa "
" 25	-	bb "

Honolulu tides used.

July 16	-	a-day
" 11	-	b " (morning)
" 17	-	e "
" 19	-	g " (10:30 A.M. om)
" 20	-	h "

August 26, 1929.

Division of Hydrography and Topography:

✓ Division of Charts:

Tide Reducers are approved in
8 volumes of sounding records for

HYDROGRAPHIC SHEET 4900

Locality: French Frigate Shoals, T. H.

Chief of Party: K. T. Adams in 1928

Plane of reference is mean lower low water, reading

3.1 ft. on tide staff at East Island, French Frigate Shoals

~~20.00000000~~

Condition of records satisfactory except as checked below:

1. Locality and sublocality of survey omitted.
2. Month and day of month omitted.
3. Time meridian not given at beginning of day's work.
4. Time (whether A.M. or P.M.) not given at beginning of day's work.
5. Soundings (whether in feet or fathoms) not clearly shown in record.
6. Leadline correction entered in wrong column.
7. Field reductions entered in "Office" column.
8. Location of tide gauge not given at beginning of day's work.
9. Leadline corrections not clearly stated.
10. Kind of sounding tube used not stated.
11. Sounding tube No. entered in column of "Soundings" instead of "Remarks".
12. Legibility of record could be improved.
13. Remarks.

H. A. Mearns
Chief, Division of Tides and Currents.

Section of Field Records.

Report on Sheet No. 4900
Chief of Party K.T. Adams
Protracted by G.E. Boothe
Verified and Inked by J. Walker

Surveyed in 1928
Surveyed by G.E. Boothe
Soundings plotted by
G.E. Boothe.

The sounding records were legible and complete except as follows: The reefs and other dangers described in the remarks column were apparently not always placed opposite the time to which they referred. When a reef was described at or adjoining a position it was not always clear as to what time the note referred. The time was mixed up in several cases. (See Vol. 2 pages 5 & 58. also Vol. 3 page 62, Vol. 4 page 5.) It was apparently the fault of the recorder.

The protracting was fairly good. Most of the positions revised or rejected were swingers or very weak fixes.

The following positions were off the sheet and were not plotted by the field. - 63-64 j, 2425 n, 59 n, 19 q, 51-52 q, 89-92 q inclusive. A "dog ear" was added by the office draftsman and the omitted positions plotted on it.

One hundred and six positions were found which were classified as swingers. The loci of the right and left angles for these swingers were plotted. In most cases the point of intersection of these loci could be determined. In some cases, however, the loci were so nearly coincident for an appreciable distance that an intersection could not be determined. In these cases if the fix could not be plotted by other means it was rejected. The following positions were rejected for this reason: 62-65 b, 26-27 d, 133 d, 94-95 f, 15 g, 19-23 h, 87-88 p, 1 e, 81-82 z, inclusive. Apparently the officer in charge of the party had no idea as to the selection of such signals as would give a strong position. It is believed that there were plenty of signals which might have been selected to give a strong position. On page 58 of the Topographic Manual the principal considerations to be remembered in the selection of control stations or signals is given.

Between position 80-81 z there is a sounding of $3\frac{1}{2}$ fathoms. Position 81 z is too weak to plot but

as the $3\frac{1}{2}$ is the shallowest sounding in that area it was plotted on line and true from position 80.

It is near a $4\frac{1}{2}$ sounding and is probably near its correct position. All the other soundings on this sheet which were rejected because of weak fms are thought to be safely rejected or omitted as they do not indicate any dangers or shallowest depths not shown by other soundings.

In most cases the soundings were plotted according to true. Where soundings were taken on turns in the line there is considerable doubt as to the exact course of the boat. Sounding lines as plotted in the field are on straight lines from position to position. Unless definite indications were found to indicate that the lines were otherwise they were accepted by the office draftsman as being straight. This was done by instruction from the chief of Field Records.

The sheet was received clean and the work was legible.

The drafting conformed to General Instructions for field work.

Shoal soundings described in the record as coral heads were shown with the legend "rk" - by order of Chief of Field Records. Also see S.P. No. 143 FP 160(a). Changed to coral head by order of Mr. Shalowitz. Mar. 10, 1932

Most of the reefs and dangers were shown on the smooth sheet in pencil and as the surveyor (G. E. Boothe) also did the protracting and plotted the soundings (and assumeably penciled in the reefs) his pencil locations were accepted unless there was strong evidence otherwise.

A note appears in the lower right corner of the smooth sheet (in pencil) that, "all reefs are bare at low tide." This note was placed there by the field men. See also the descriptive report page 2, paragraph headed "Description," next to last sentence.

Eight hundred and twenty six positions were checked and of these 67 were revised or rejected. One hundred and sixteen soundings were counted as having been revised.

Sheets H 4901 and 4902 were not inked
and where they overlap this sheet the
curves were not inked in.

Reviewed by

Respectfully submitted
JFW Walker
2/17/30.

Note. - Numerous notes in the sounding records make mention of
"Shoals" so many meters away in a certain direction. These were
shown by the writer, by order of Mr. Shalowitz, as a group of sunken
rocks inclosed by a dotted line.

JFW
3/10/32

Section of Field Records

Review of Hydrographic Sheet No. 4900
East Island and vicinity, French Frigate Shoals,
Hawaii.

Surveyed 1928

Instructions of the Director dated March 26, 1928

Chief of Party - K. T. Adams

Surveys by G. E. Boothe

Protracted and soundings plotted by G. E. Boothe

Verified and inked by J. T. Walker.

1. Records:- The sounding records are legible and in conformity with the Regulations. More detailed descriptive notes in the Remark Column would be useful, that is, estimated depths over sunken rocks and the extent of reefs awash. This is especially desirable when they are not sketched on the boat sheet. The Descriptive Report gives a good idea of the character of the area surveyed, but is too general for a later graphic representation of these features on the smooth hydrographic sheet. The records contain an excessive ^{number of very weak} fixes (see verifier's report).
2. Sounding lines:- See the verifier's report for changes in plotting of positions. Due to variable currents the lines could not be held within the 100 meter limit and a number of open spaces are the result. There is no record of the character of the lookout maintained during the survey or the under water visibility. Shoals rise abruptly and no part of the area inside the 10 fathom curve can be considered fully developed. Even outside the 10 fathom curve there can be no assurance that all the dangers have been found.
3. Depths curves:- Northward and eastward of East Island the 5 fathom curves are very complicated. The curves drawn on the sheet should not be regarded as representing actual conditions, but serve only to group the soundings shown. A much larger scale and very many more sounding lines would be necessary to show actual conditions in this area.
4. Adjacent and overlapping surveys:- The junction with adjoining sheets is satisfactory. The area to the eastward of this sheet consists of shallow water and reefs, many of which are awash.
5. The survey was made "to find protected anchorages in and around East Island, French Frigate Shoals." Anchorage may be found southwestward of East Island outside the 10 fathom curve in a considerable area apparently free from shoals. The Descriptive Report mentions three areas where small vessels can find more protected anchorage.
6. Drafting, etc.- The plotting, verification and inking was carefully done. Assuming that the depth over a "sunken rock" was less than 5 fathoms, that curve was drawn around several rocks not otherwise marked by curves.

7. Additional Work:- If opportunity affords and if it is found practicable to do so, it is recommended that ^{the} possible anchorage only, to the southwest of East Island be wire-dragged.

8. Reviewed by R. J. Christman, February, 1932.

Sheet inspected and recommendations approved by A. L. Shalowitz.

A. M. Bohieralski

Applied to Chart 4182 7/25/40 CRBSI-

Applied to chart 4172 Aug 2 1946 LL